REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-13 are presently active in this case, Claims 1 and 8 amended by way of the present amendment.

In the outstanding Official Action, the drawings were objected to and Claims 1-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent number 5,691,642 to Dobkin in view of U.S. patent number 3,885,874 to Haas et al.

First, Applicants wish to thank Examiner Kerveros for the August 30, 2004 personal interview at which time the outstanding issue in this case were discussed. During the interview, Applicants presented amendments and arguments substantially as indicated in this response. While no agreement was reached as to the allowablity of the pending claims, Examiner Kerveros indicated that clarifying the claims to recite sweeping a signal in a decreasing and increasing directions overcomes the outstanding rejection under 35 U.S.C. § 103(a) based on Dobkin and Hass et al.

With regard to the objection to the drawings, submitted herewith is a replacement drawing sheet for Figure 2. The replacement drawing sheet includes the labels "f_{max}," "f_{min}," "f_{final}," and "f_{open}" in a proper character size. Thus, the objection to the drawings is believed to be overcome.

Turning now the merits, in order to expedite issuance of a patent in this case, independent Claims 1 and 8 have been amended to clarify the patentable distinctions of the present invention over the cited references. Specifically, Applicant's independent Claim 1 recites a system for measuring a plasma electron density in a plasma chamber, the system including a plasma chamber containing a plasma, and a frequency source for providing a signal to the plasma chamber such that the signal sweeps in a decreasing frequency direction

and then sweeps in an increasing frequency direction. A resonance frequency detector detects a first set of resonance frequencies excited by the decreasing frequency sweep and detects a second set of resonance frequencies excited by the increasing frequency sweep. A comparative for determining a difference between a number of frequencies in the first and second sets and a fringe order calculator determines a fringe order of the plasma. A density calculator then determines a plasma electron density of the plasma based on the fringe order. Thus, Claim 1 has been amended to clarify that the frequency source provides a signal that sweeps in a decreasing frequency direction and then sweeps in an increasing frequency direction. Claim 8 has been similarly amended to recite a sweep frequency feature in method claim format.

In contrast, Dobkin discloses a method and apparatus for characterizing the electron density of a plasma based on broadband electromagnetic measurements. As seen in Figure 1 of Dobkin, the system of this reference includes a wideband microwave source 26 coupled to a plasma chamber 10. The wideband microwave source 26 generates an electromagnetic signal having a broad frequency spectrum encompassing a plurality of resonance frequencies of the chamber 10.[1] The wideband microwave source 26 is used to generate a set of broad band calibration spectra by measuring transmission of the broadband electromagnetic energy through a calibration plasma. For example, Figures 3 and 4 show the broadband spectrum provided by the system of Dobkin. Each calibration spectrum relates to a known physical characteristic of the calibration plasma, including for example electron density. The calibration plasma spectra are then compared to a broadband spectra obtained in an actual test plasma to determine physical characteristics, such as plasma density, of the test plasma. However, as discussed in the August 30th interview, Dobkin does not disclose any frequency variation of the wideband microwave source 26. Thus, Dobkin does not disclose a frequency

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[1] Dobkin at column 4, lines 45-55.

source for providing a signal to a plasma chamber such that the signal sweeps in a decreasing frequency direction and then sweeps in an increasing frequency direction as now recited in Claims 1 and 8.

The cited reference to Haas et al. does not correct the deficiencies of Dobkin. As discussed in the August 30, 2004 personal interview, the cited reference to Haas et al. discloses the use of optical interferometry for measuring the plasma electron density. As seen in Figure 1 of Haas et al. a laser 12 provides a beam through a plasma 26 for use by the system. As disclosed in Haas et al., the laser 12 emits a coherent collimated laser beam of predetermined frequency or wavelength.[2] That is, the laser 12 is of a fixed frequency. Thus, Haas et al. also does not disclose the limitation of a frequency source for providing a signal to a plasma chamber such that the signal sweeps in a decreasing frequency direction and then sweeps in an increasing frequency direction as now recited in Applicant's Claims 1 and 8.

Thus, Applicant's independent Claims 1 and 8, as amended, patentably defines over the cited reference to Dobkin and Haas et al. alone or in combination. Moreover, as Claims 2-7 and 9-13 depend from Claims 1 and 8 respectively, these claims also patentably define over the cited references.

[2] See Haas et al. at column 3, lines 50-52.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. An early and favorable actions is therefore respectfully requested.

Respectfully submitted,

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